Aliphatic Alcohols

4

C_6H_6 Aromatic benzene

Coal tar — (Fractional distillation) 80 °C → benzene

C_6H_{14} (Normal hexane) — Pt / Δ → benzene

$3C_2H_2$ (Ethyne) — Red hot Nickel tube → benzene

C_6H_5OH (Phenol) — Zn / Δ → benzene

C_6H_5COONa (Sodium benzoate) — NaOH CaO / Δ → benzene

Addition

- $3H_2$ / Ni, Δ (Hydrogenation) → Cyclo Hexane
- $3Cl_2$ / U.V (Halogenation) → Hexa Chloro Cyclo Hexane (Cl, Cl, Cl, Cl, Cl, Cl)

Substitution

- Cl_2 / U.V, $FeCl_3$ → Chloro Benzene (Cl) — $2HNO_3$, H_2SO_4 → Ortho and para nitro chloro benzene (Cl, NO_2 + Cl, NO_2) + $2H_2O$
- HNO_3, H_2SO_4 → Nitro Benzene (NO_2) — Cl_2 / U.V, $FeCl_3$ → Meta chloro nitro benzene (NO_2, Cl) + HCl
- H_2SO_4 (Sulphonation) → Benzene Sulphonic acid (SO_3H) + H_2O
- CH_3Cl / $AlCl_3$ (Alkylation) → Toluene (CH_3) — $3HNO_3$ / H_2SO_4 (Nitration) → T.N.T (CH_3, O_2N, NO_2, NO_2) + $3H_2O$

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Secondary and tertiary Alcohol

6



2-Bromo,Propane

$CH_3-\underset{\underset{Br}{|}}{CH}-CH_3$ $\xrightarrow[\text{(Alkalin Hyd.)}]{\text{NaOH (aq)}, \Delta}$ Iso Propyl Alcohol $CH_3-\underset{\underset{OH}{|}}{CH}-CH_3$ (2-Propanol) $\xrightarrow[\text{KMnO}_4 / H_2SO_4 \text{ (Oxidation)}]{+(O)}$ Acetone $CH_3-\underset{\underset{O}{\|}}{C}-CH_3$ (2-Propanone)

$CH_2=CH-CH_3$ (Propene) $\xrightarrow[H_2SO_4 / 110\ ^\circ C \text{ (Hydrolysis)}]{+H_2O}$ Iso Propyl Alcohol (2-Propanol)

2-Bromo, 2-Methyl, Propane

$CH_3-\underset{\underset{Br}{|}}{\overset{\overset{CH_3}{|}}{C}}-CH_3$ $\xrightarrow[\text{(Alkalin Hyd.)}]{\text{NaOH (aq)}, \Delta}$ $CH_3-\underset{\underset{OH}{|}}{\overset{\overset{CH_3}{|}}{C}}-CH_3$ (2-Methyl, 2-Propanol) $\xrightarrow[KMnO_4 / H_2SO_4]{+(O)}$ No reaction



$CH_3-\overset{\overset{CH_3}{|}}{C}=CH_2$ (2-Methyl, Propene) $\xrightarrow[H_2SO_4 / 110\ ^\circ C \text{ (Hydrolysis)}]{+H_2O}$ 2-Methyl, 2-Propanol

Aromatic Carboxylic Acids

Aliphatic carboxylic acids

7

Phenols

Calcium dicarbide

CaC_2

$+ 2H_2O$ / $- Ca(OH)_2$

C_2H_2

Ethyne

Red hot / Ni tube / Trimerization

Aromatic benzen

$+ Cl_2$ / $FeCl_3$ / U.V

Phenyl Chloroide

Cl

Chloro benzen

$+ NaOH$ / 300 °C / 300 atm.

OH

Carbolic acid

Phenol

$+ HCl$

$+ Na$

$+ H_2$

Sodium Phenoxide

ONa

$+ NaOH$

Sodium Phenate

$+ H_2O$

ONa

$+ 3HNO_3$ / H_2SO_4 (Nitration)

OH, O_2N, NO_2, NO_2

$+ 3H_2O$

2,4,6-Tri Nitro Phenol

Br_2 Water

White ppt.

$FeCl_3$

Violet color

$+ HCl$

No reaction

$+$ Formaldehyde / Cond. polymerization

Bakelite

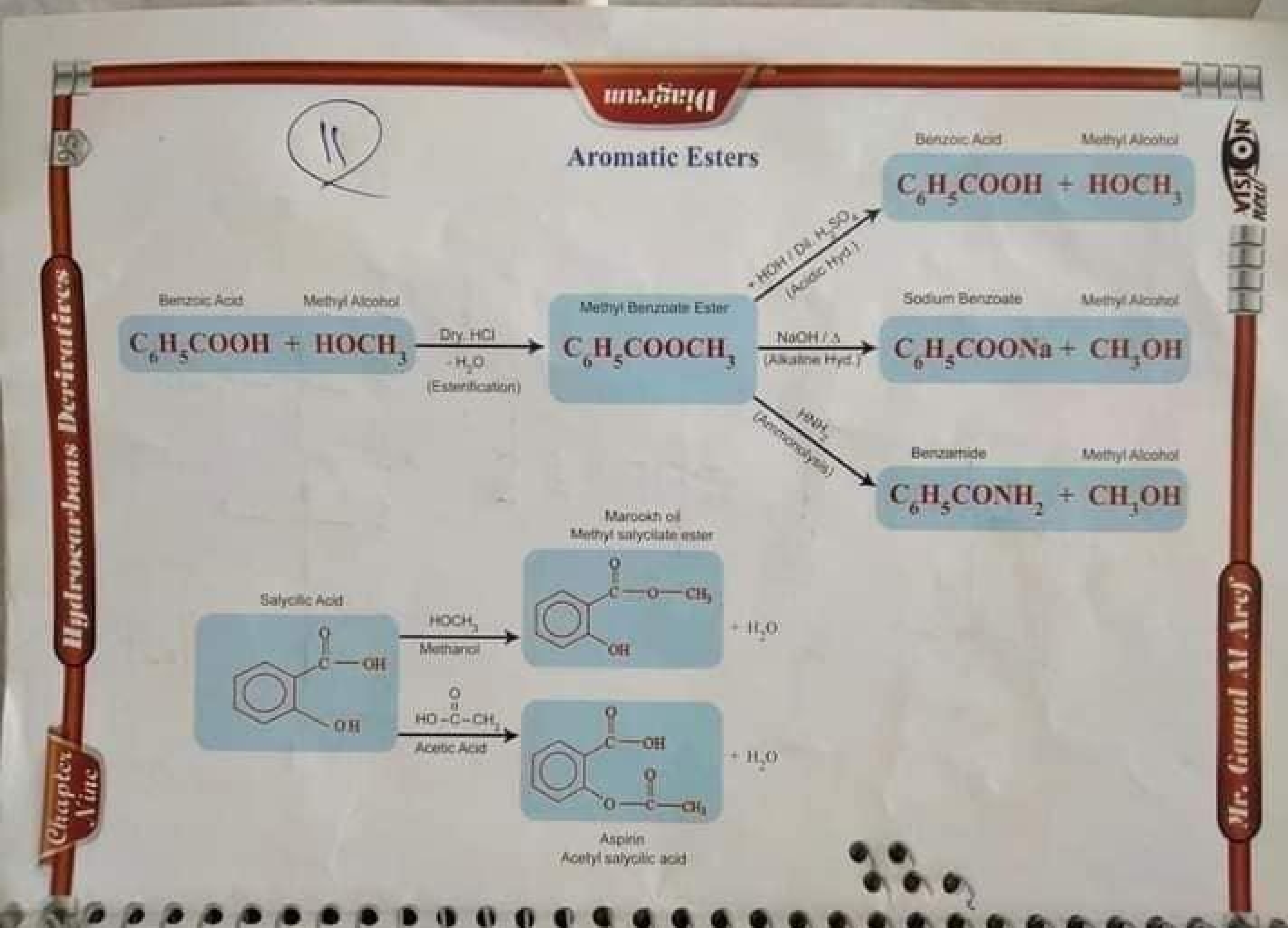


Diagram
Aromatic Esters
Benzoic Acid
Methyl Alcohol
$C_6H_5COOH + HOCH_3$
Dry HCl
$-H_2O$
(Esterification)
Methyl Benzoate Ester
$C_6H_5COOCH_3$
$+HOH$ / Dil. H_2SO_4
(Acidic Hyd.)
Benzoic Acid
Methyl Alcohol
$C_6H_5COOH + HOCH_3$
NaOH / Δ
(Alkaline Hyd.)
Sodium Benzoate
Methyl Alcohol
$C_6H_5COONa + CH_3OH$
HNH_2
(Ammonolysis)
Benzamide
Methyl Alcohol
$C_6H_5CONH_2 + CH_3OH$
Salycilic Acid
$HOCH_3$
Methanol
Marookh oil
Methyl salycilate ester
$+ H_2O$
Acetic Acid
$+ H_2O$
Aspirin
Acetyl salycilic acid
Hydrocarbons Derivatives
Chapter Nine
Mr. Gamal Al Aref
VISION
95

Aliphatic Esters



